

# General Science & Ability

## PART-II

### SECTION-II

#### QUESTION NO:06

A) Data:

Votes of three candidates

15000, 10,000 and 8000

To find:

Percentage of total votes of the  
winning candidate = ?

Solution:

Sum all the votes:

$$= 15000 + 10000 + 8000$$

$$= 33000$$

$$\% \text{ of winning candidate} = \frac{\text{obtained votes}}{\text{Total votes}} \times 100$$

$$= \frac{15000}{33000} \times 100$$

$$= \frac{15}{33} \times 100$$

$$= 45.5\%$$

Therefore, the percentage of the winning candidate  
is 45.5%.

Answer.

B) Data:

Given ratio of angles of triangle :  
3:4:5

To find:

Find the each angle = ?

Solution:

As, we know, sum of three angles =  $180^\circ$

Therefore,

$$3:4:5 = 180$$

However, we have to find the angle, so 'x' is  
the angle:

$$\therefore 3x + 4x + 5x = 180$$

$$\Rightarrow 12x = 180$$

$$\Rightarrow x = \frac{180}{12} = 15$$

$$\Rightarrow x = 15$$

Now, put the value of x and find angles:

$$\text{1st angle: } 3 \times 15 = 45$$

$$\text{2nd angle: } 4 \times 15 = 60$$

$$\text{3rd angle: } 5 \times 15 = 75$$

To verify, sum all the values:

$$45 + 60 + 75 = 180 \text{ verified}$$

Answer.



c) Data:

Each group consists of:  
4 boys and 6 girls

102 girls available

To find:

Number of boys required =  $x = ?$

Solution:

First, find number of groups:

$$\Rightarrow \frac{102}{6} \text{ girls/group}$$

$$\Rightarrow 17 \text{ groups}$$

Now, number of boys required:

$$\Rightarrow 17 \times 4 \text{ boys/group}$$

$$\Rightarrow 68$$

Therefore, 68 boys are required to form the groups in the sports meet.

Answer.



D) Data:

Ratio of A:B = 6:7

After five years ratio will be = 7:8

To find:

Present Ages of A and B

Solution:

Given is the ratio between A and B = 6:7

After five years ratio will be 7:8

Let 'x' be the present ages of A and B,  
and from the statements:

$$6x+5 : 7x+5 = 7:8$$

$$\therefore \frac{6x+5}{7x+5} = \frac{7}{8}$$

By cross-multiplication:

$$8(6x+5) = 7(7x+5)$$

$$48x+40 = 49x+35$$

Re-Arranging:

$$\Rightarrow 49x - 48x = 40 - 35$$

$$\Rightarrow x = 5$$

Put the value of 'x' to find present ages:

$$6 \times 5 = 30 \quad \text{and} \quad 7 \times 5 = 35$$



Therefore, the present ages of A and B are  
30 and 35.

Answer.

### QUESTION NO: 08

c)

Find correct word from the Jumbled spellings:

Jumbled spelling	Correct Words
THRSI	Shirt
GNDREA	Danger
SCHAMOT	Stomach
ONLNDO	London
HIODALY	Holiday

A) Data:

Sum of three consecutive  
odd Numbers = 273

To find:

Three odd Numbers = ?

Solution:

Let three consecutive numbers are:

$x, x+2, x+4$



Their sum is:

$$x + (x+2) + (x+4) = 273$$

$$x + x + 2 + x + 4 = 273$$

$$3x + 6 = 273$$

$$3x = 273 - 6$$

$$3x = 267$$

$$x = \frac{267}{3} = 89$$

$$x = 89$$

Now, put the values in:

$$\text{First Number } x = 89$$

$$\text{Second Number} = x + 2 = 89 + 2 = 91$$

$$\text{Third Number} = x + 4 = 89 + 4 = 93$$

Therefore, the three consecutive odd numbers are 89, 91 and 93.

Answer.

B) Given:

Series of number with one missing number

Find:

Missing number in the series.



Solution:

i) 4, 16, 36, 64, ?, 144

The series is the square of even numbers:

Therefore:

$$2^2 = 4$$

$$4^2 = 16$$

$$6^2 = 36$$

$$8^2 = 64$$

$$10^2 = 100$$

$$12^2 = 144$$

The series is: 4, 16, 36, 64, 100, 144.

Answer.

iii) 1, 7, 15, 25, ?, 51

The series is the multiple of '2' starting  
from ~~6 to 11~~ 3 to 7:

1

$$2 \times 3 + 1 = 7$$

$$2 \times 4 + 7 = 15$$

$$2 \times 5 + 15 = 25$$

$$2 \times 6 + 25 = 37$$

$$2 \times 7 + 37 = 51$$

The series is: 1, 7, 15, 25, 37, 51 Answer.



ii) 30, 29, 27, ?, 20, 15

Series is in descending with subtraction of numbers, such as;

$$30 - 1 = 29$$

$$29 - 2 = 27$$

$$27 - 3 = 24$$

$$24 - 4 = 20$$

$$20 - 5 = 15$$

Therefore, series is : 30, 29, 27, 24, 20, 15

Answer.

iv) 0, 2, 6, 12, 20, 30, ?

0

$$0 + 2 \times 1 = 2$$

$$2 + 2 \times 2 = 6$$

$$6 + 2 \times 3 = 12$$

$$12 + 2 \times 4 = 20$$

$$20 + 2 \times 5 = 30$$

$$30 + 2 \times 6 = 42$$

The series is : 0, 2, 6, 12, 20, 30, 42.

Answer.



v) 48, 24, 72, 35, 108, ?

←—————→

D) Data:

Sara's mother =  $6x$  older than Sara

her brother Ali  $2x$  as old as Sara

sum of their ages = 72

To find:

Sara, Ali and Mother present age = ?

Solution:

Let ' $x$ ' be Sara's age:

Given is;

Sara's mother is :  $6x(x)$

Her Brother Ali is :  $2x$

~~$6x + 2x + x = 72$~~

In three consecutive years, the sum of their ages will be:

$$(6x+3) + (2x+3) + (x+3) = 72$$

$$6x+3+2x+3+x+3=72$$

$$9x+9=72$$

$$\Rightarrow 9x=72-9$$

$$\Rightarrow 9x=63$$

$$\Rightarrow x=63/9$$

$$\boxed{\Rightarrow x=7}$$



Their present Age's :

$$\text{Mother} : 6(7) + 3 = 45 \text{ years}$$

$$\text{Ali} : 2(7) + 3 = 17 \text{ years}$$

$$\text{Sara} : 7 + 3 = 10 \text{ years.}$$

Answer.

si ===== in



## SECTION - I

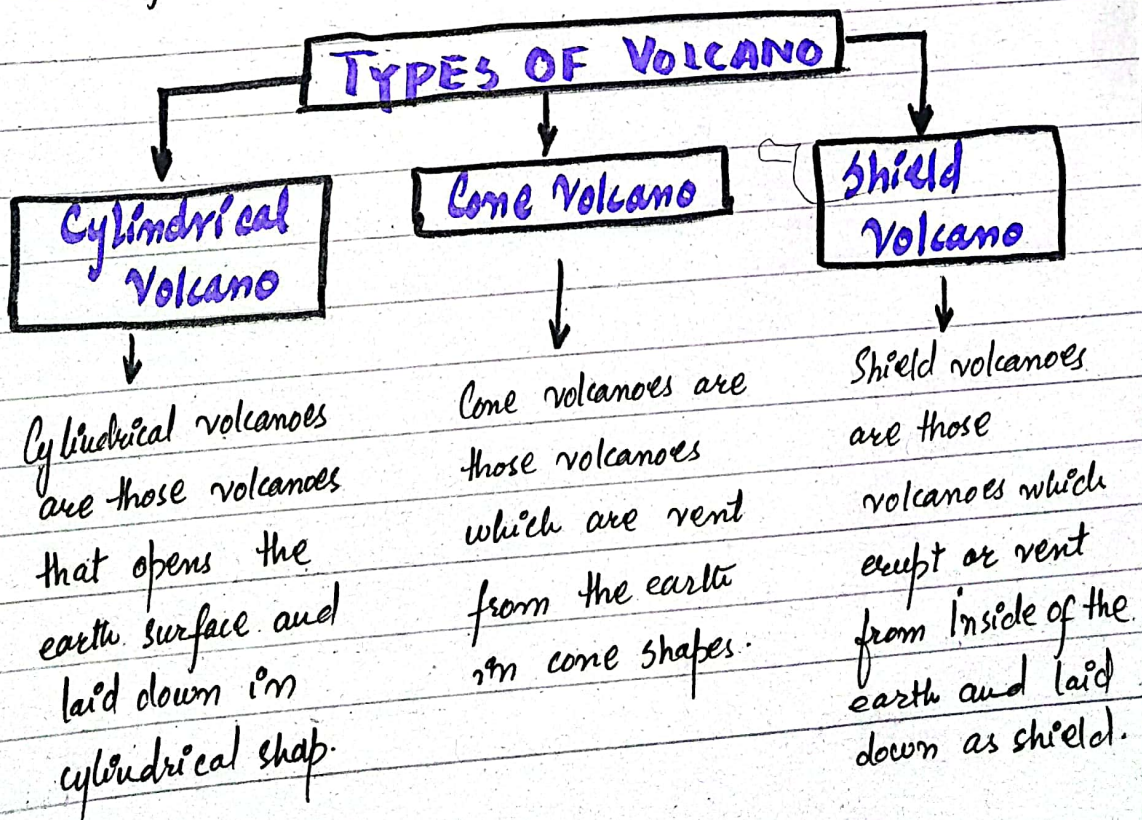
### QUESTION NO: 02

A) On 18<sup>th</sup> december 2023 volcano was erupted in Iceland and after series of small earthquakes, discuss how volcanoes are erupted?

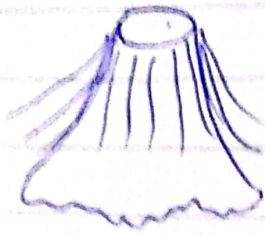
### VOLCANOES:

#### DEFINITION:

Volcanoes are stream of hot lava or magma erupted from the inside of the earth. It is made up in the mantle part of the earth, a part beneath the crust of the Earth.







⇒ Cone Volcanoes form mountains



⇒ Shield Volcanoes form the earth's vent



⇒ Cylindrical Volcanoes.

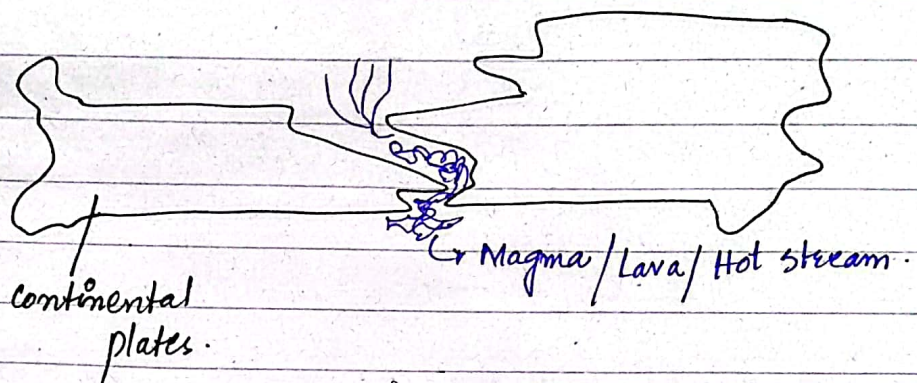
### HOW VOLCANOES ARE ERUPTED:

Volcanoes are erupted because of the following reasons:

01) Deep focus Earthquakes ~ Primary Reason of Volcanoes ~

Volcanoes are erupted due to the massive earthquakes. The deep focus earthquakes are caused due to inter-plate disturbance because inside them a hot lava or magma present and when these plates diverge or converge, the magma erupted and caused earthquake. It is illustrated below:





### 02) Molten Rock Frag Formation:

Inside the Earth, there is a huge and intense heat which melts the rock and form flowing substance called magma. This magma rock is much lighter than the solid rocks, therefore, it flows on the surface of the earth - vent.

### 03) Intense Pressure Build up inside the Earth:

A number of gases are dissolved or trapped within the magma. When pressure decreases then the gases start to expand and create intense pressure on the solid rocks and resulted in volcano eruption.

### 04) Eruption Trigger: ~ Nuclear Reactions ~

Volcanoes are also erupted when the magma chambers are triggered due to any explosion on the earth surface. It is formed, when any trigger occurs, the magma release gases to



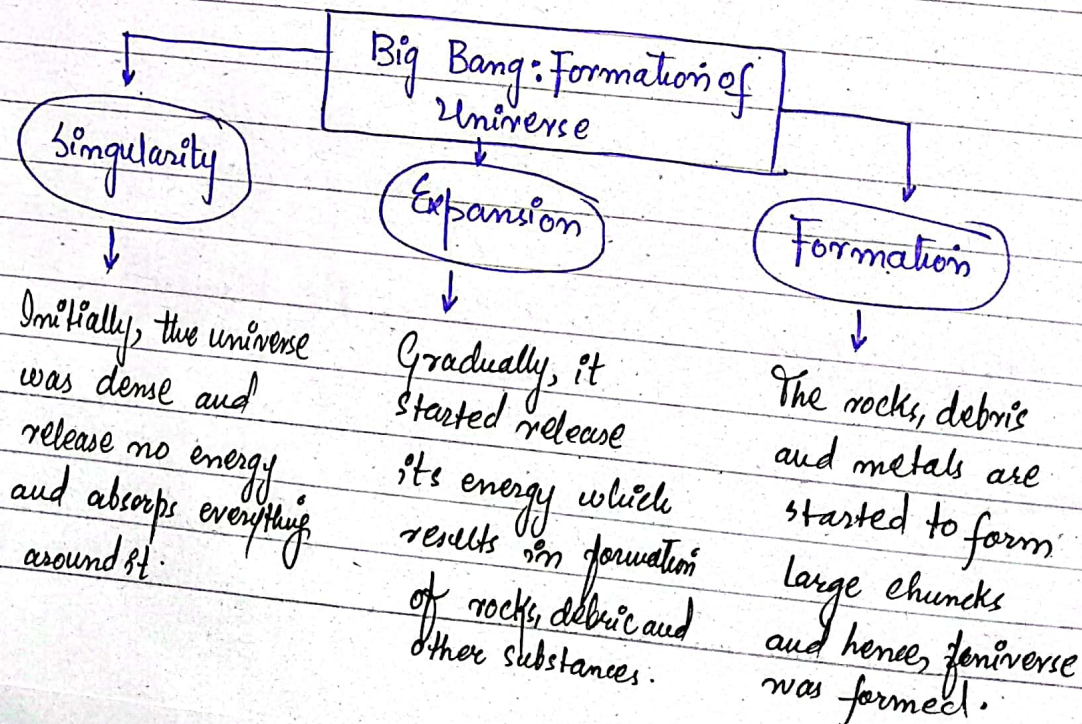
expand which resulted in intense pressure and volcanoes erupted on the surface of the earth-vent.

~:-----:~

B) What is Big Bang and Big crunch? How age of the universe is determined?

## BIG BANG: ~ DEFINITION ~

Big Bang is a theory of the universe expansion. It is a theory which is used to explain or substantiate the evidences of the formation of universe and its expansion. According to the Big Bang theorists, universe was initially singular, which after a time expands by releasing its energy and formed universe.





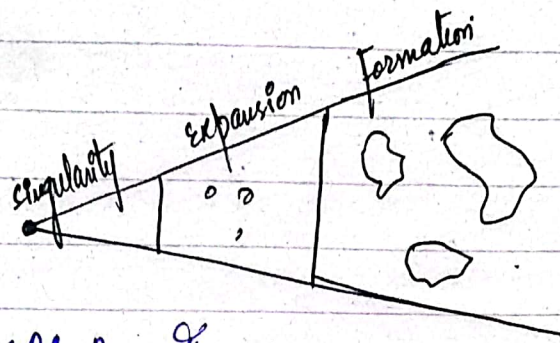
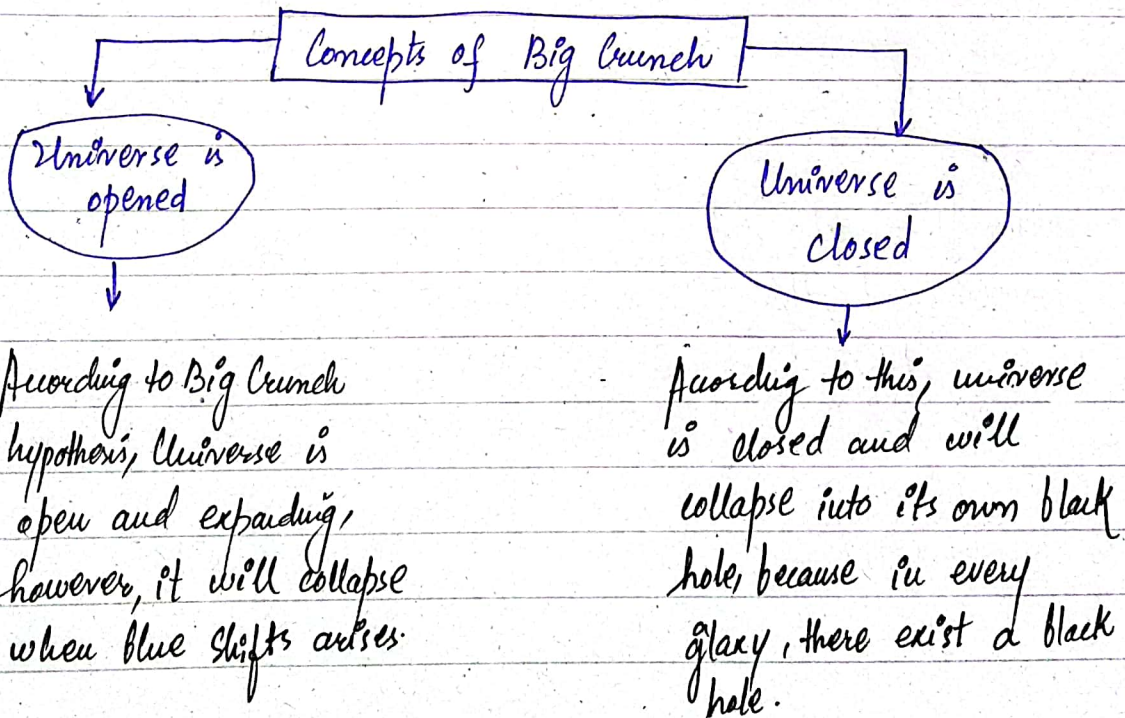


Fig: Big Bang Theory

## BIG CRUNCH IN DEFINITION

Big Crunch is a hypothetical scenario for the universe's future. It proposes that the expansion of the universe will eventually slow down and reverse, leading to a collapse back into a singularity similar to the Big Bang's starting point.

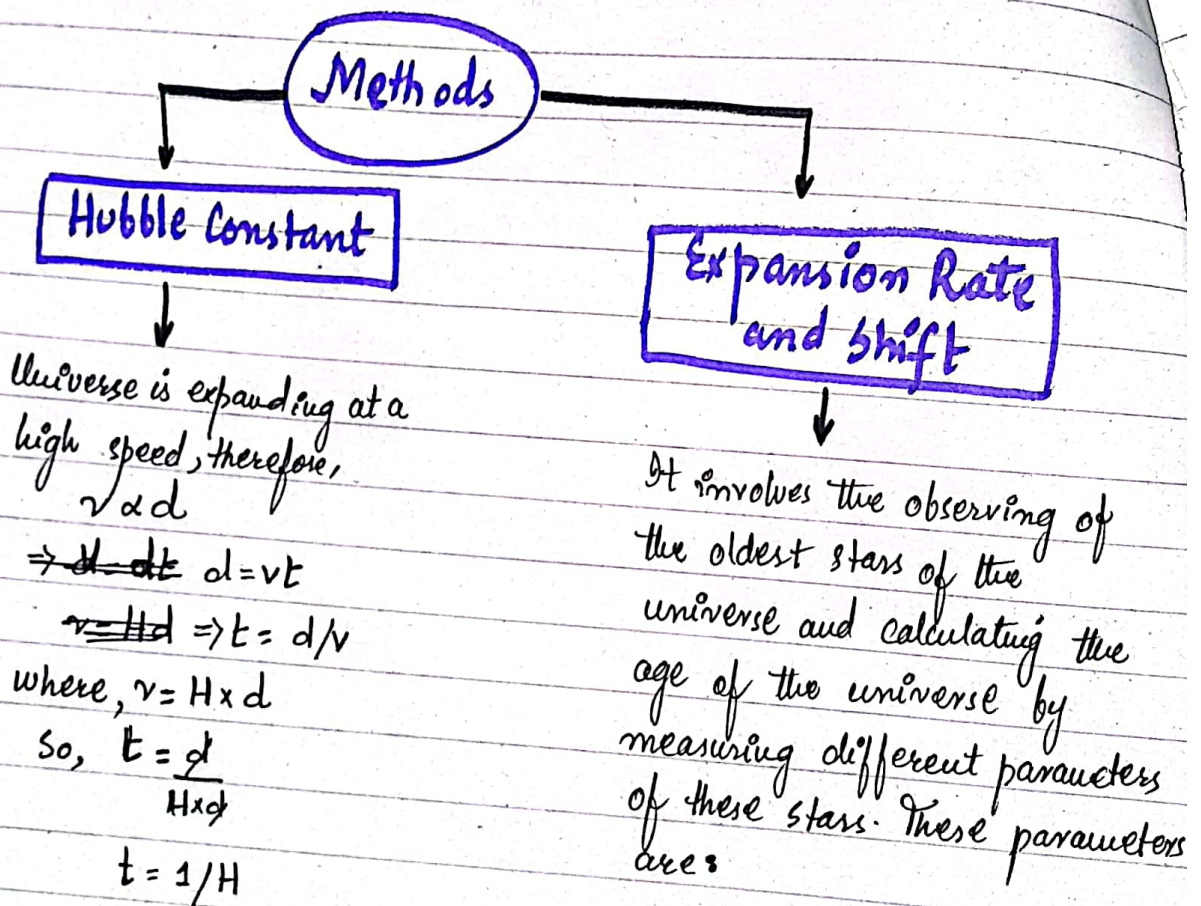




# How AGE OF THE UNIVERSE DETERM

The age of the universe is determined by two methods:

- 01) Hubble constant
- 02) Expansion Rate and Shift in universe.



Hence, scientist were able to use hubble constant to determine the age of the universe.

- 1) luminosity
- 2) Speed and Spectrum
- 3) Red and Blue Shift
- 4) Mass



c) Discuss any five sources of renewable energy.

## RENEWABLE ENERGY: ~ DEFINITION ~

Renewable energy is a source of energy to produce clean and environmental friendly energy. It does not use any natural resource which contains carbon emissions and nitrogen gases. It is not only carbon free but also efficient source of energy production which is cost effective and available domestically.

## SOURCES OF RENEWABLE ENERGY:

There are five sources of renewable energy available which are discussed below:

### 01) Solar Energy: ~ From Sun Heat ~

Solar energy is an efficient source of energy production for commercial and domestic use. It is a type of renewable energy, hence, it is cost-effective and environmental friendly.

#### Capture of Solar Energy:

Solar energy is captured by the sunlight into solar voltaic cells fitted on solar panels and ge which convert the heat into electrical energy.



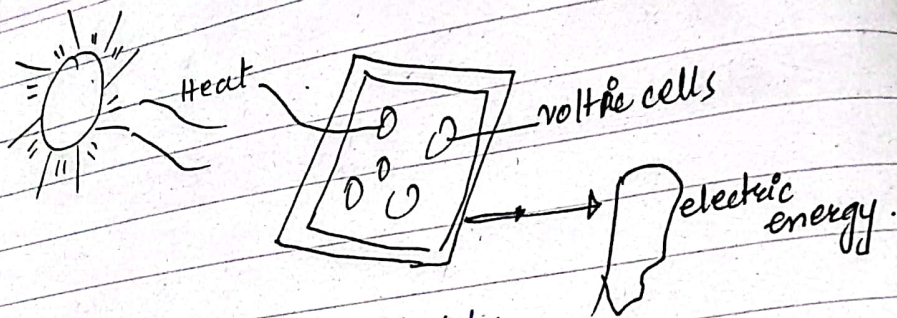


Fig: Phenomenon of Solar Energy formation

## 02) Wind Energy:

Wind energy is another source of renewable energy and is generated by air. Air stores kinetic energy and the wind turbines capture this kinetic energy and convert it into electrical energy for the usage of large commercialisation and sectors.

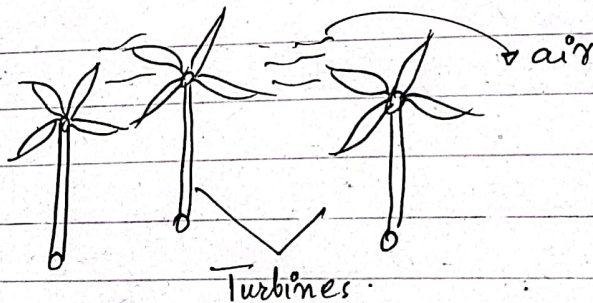


Fig: Phenomenon of Wind Energy.

## 03) Hydel Energy: ~ Water source ~

Another form of energy is hydel energy. It is produced by water resources.



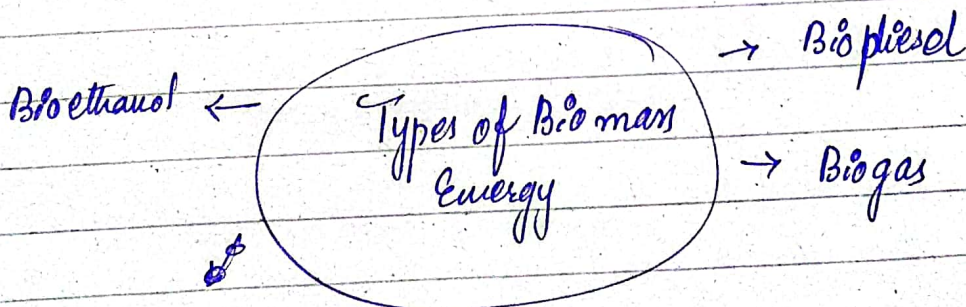
It is a form of renewable energy and used to produce energy for commercial and domestic use. The water stores potential energy and the hydro energy plants convert this potential energy into electricity and provide energy which is environmental friendly.

#### 04) Geothermal Energy:

Geothermal energy is a form of renewable energy source and it is used to generate local energy to meet domestic energy demands. It taps the internal heat of the earth by extracting steam or hot water from the underground reservoirs. It provides reliable baseload power source but is limited to specific geographical location.

#### 05) Biomass Energy:

It is derived from the organic materials of the agricultural products. Such as, animal waste, wood, crops waste and crops itself. They provide various byproducts such as heat, biofuels and electricity.

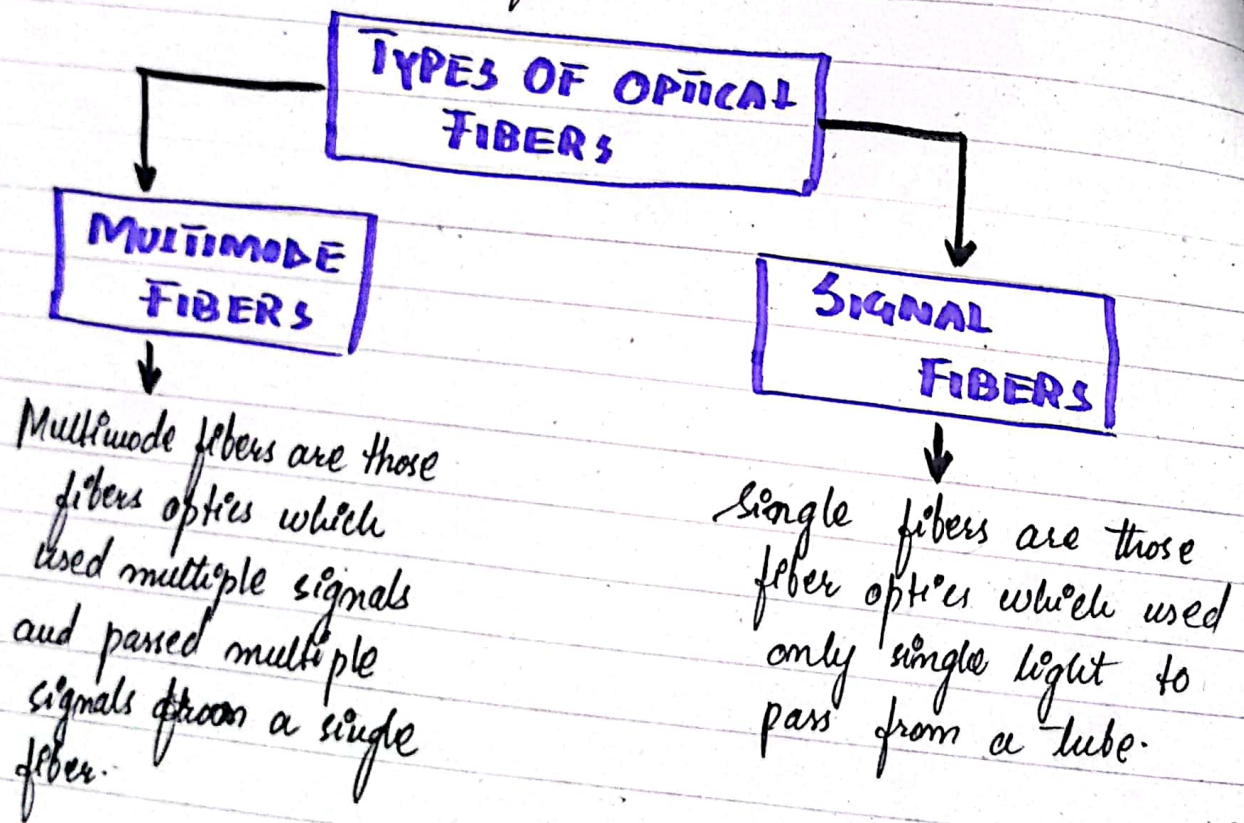




D) Optical fiber: Khunjerab to city Rawalpindi. How it works

## OPTICAL FIBER: ~ DEFINITION ~

Optical fiber is a flexible glass or plastic fiber that can transmit light from one end to another. It is used to transmit light signals from one end to another end and these light signals contain information.



## WORKING OF OPTICAL FIBER:

Total Internal Reflection: It is an angle of reflection from an incident line and reflects slightly on an angle less than  $42^\circ$ . This phenomenon is known as total internal reflection.



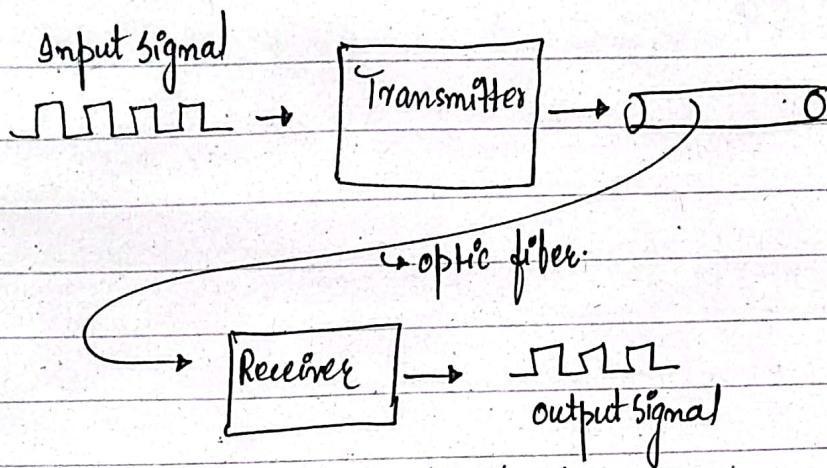
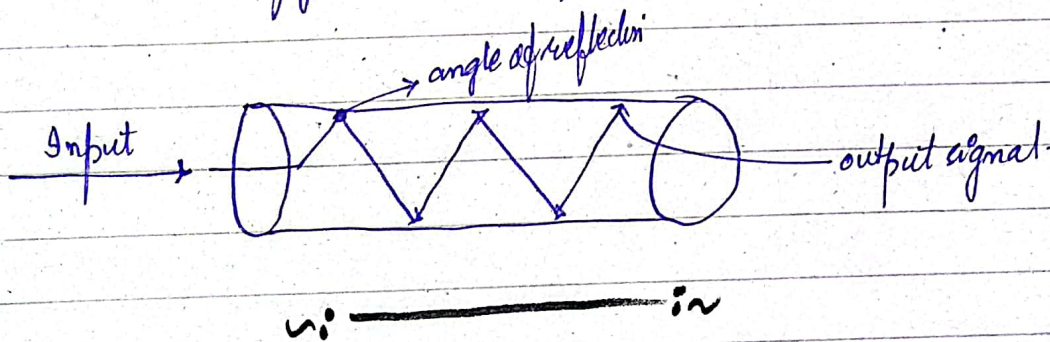


Fig: Working of Optical fiber.

Optical fiber works as, it takes input signal in a light form which transfers to transmitter and this transmitter emits light to the optical fiber to send it to the receiver. The receiver takes signal from optical fiber and converts it into output signal.

Fig: Internal Reflection of Optical fiber.



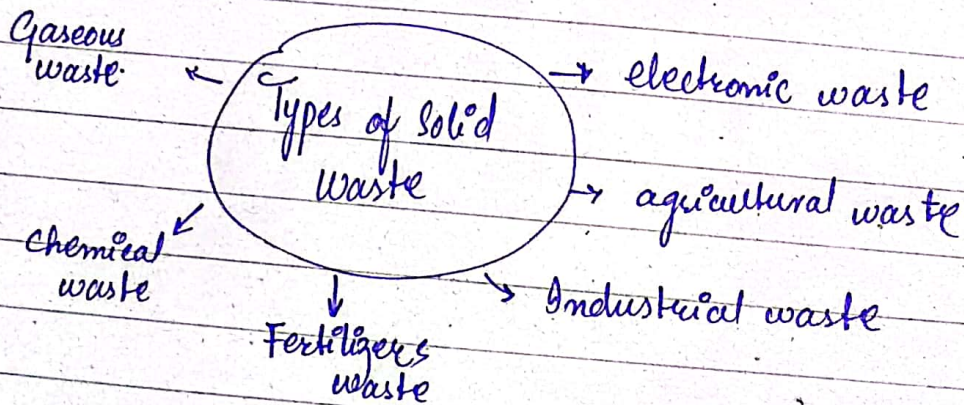


## QUESTION No 04

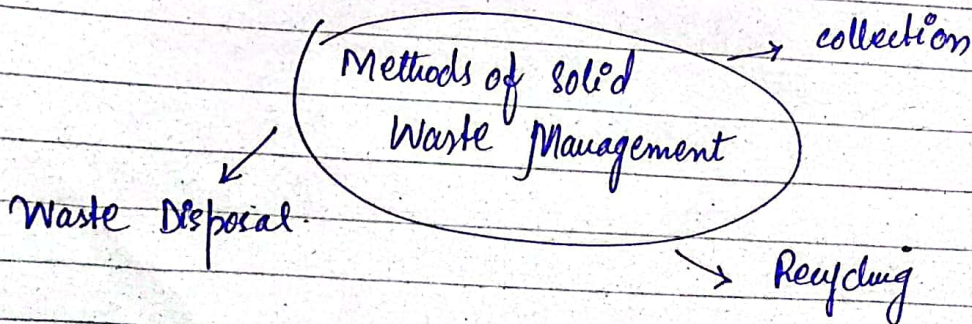
A) What are the methods of solid waste Management? 03)

### SOLID WASTE MANAGEMENT: ~ DEFINITION ~

Solid waste management is a supervised mechanism which involves collection, recycle and waste disposal to a safe side. It is a mechanical or systematic approach to manage solid waste to provide clean or clear environment to the masses.



### METHODS OF SOLID WASTE MANAGEMENT:





### 01) Collection & primary stage of solid waste Management

This is an initial stage of solid waste management. In this stage, the municipal committee workers collect the waste from various sites, it includes, electronic waste, domestic waste and agriculture or animal waste.

### 02) Recycling stage:

This stage involves to recycle the waste collected from various sites. It involves recycle, reduce and reuse mechanism of various waste substances.

### 03) Waste Disposal Mechanism:

This stage is a last and final stage of solid waste management. It involves various methods to dispose solid waste outside the city or produce any useful substance from it.

#### Methods of Solid Waste Management

- Cx Composting
- Cx Vermi composting
- Cx Landfills.



## a) Composting:

This method is an efficient method of solid waste management. It disposes the waste using biological methods and produce a byproduct from it.

### ⇒ Parameters of Composting:

- 1) Air
- 2) Temperature  $5-15^{\circ}\text{C}$
- 3) PH level
- 4) Oxygen level.

### → Components Required of Composting:

- 1) Bacteria's
- 2) Enzymes
- 3) Antigens
- 4) Pathogens.

## r) Stages of Composting

Thermophilic



In this stage, the temperature rises to  $40^{\circ}\text{C}$  and decompose small waste and use bacteria and enzymes.

Mesophilic



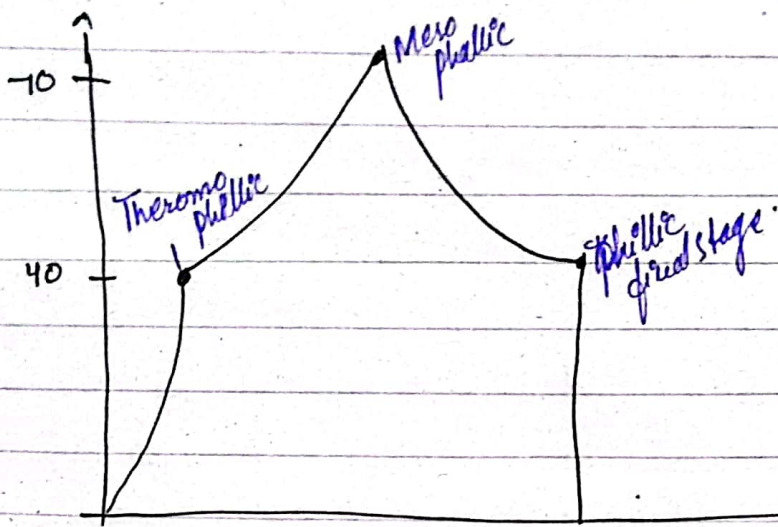
The temperature rises to  $70^{\circ}\text{C}$ . The mesophilic stage starts and it decompose all the large waste to make a product.

Psychrophilic



The temperature gradually decreases to  $40^{\circ}\text{C}$  again and remove the useless waste and separate products of fertilizers.





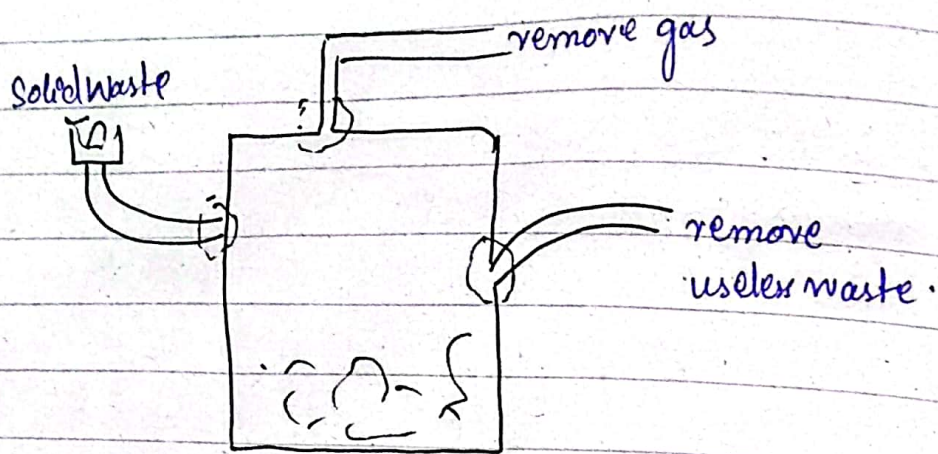
### b) Vermi Composting:

This method includes only two stages: Thermophilic and mesophilic. In first stage the temperature rises to  $40^{\circ}\text{C}$  and organic matter decomposed. In second phase, the temperature gradually increases upto  $70^{\circ}\text{C}$ , in this prolonged high temperature extensive organic or non-organic matters are decomposed. It is widely used in India and other developing states.

### c) Incineration:

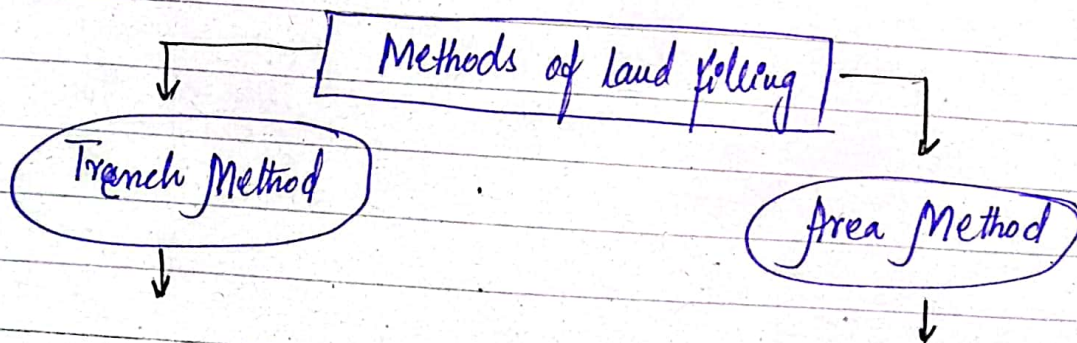
Incineration is another method of solid waste management. In this, a container contains limited temperature and oxygen and the solid waste. Due to high temperature, the waste decomposed and release gas as a product for domestic use. The phenomenon is illustrated below:





### d) Land filling:

Land filling is another method of solid waste management. This method is widely used in various countries due to its easiness and simplicity along with cost effective for various states.



It is used by digging inside the earth like a long trench and dispose solid waste and cover it with a blanket of insulation.

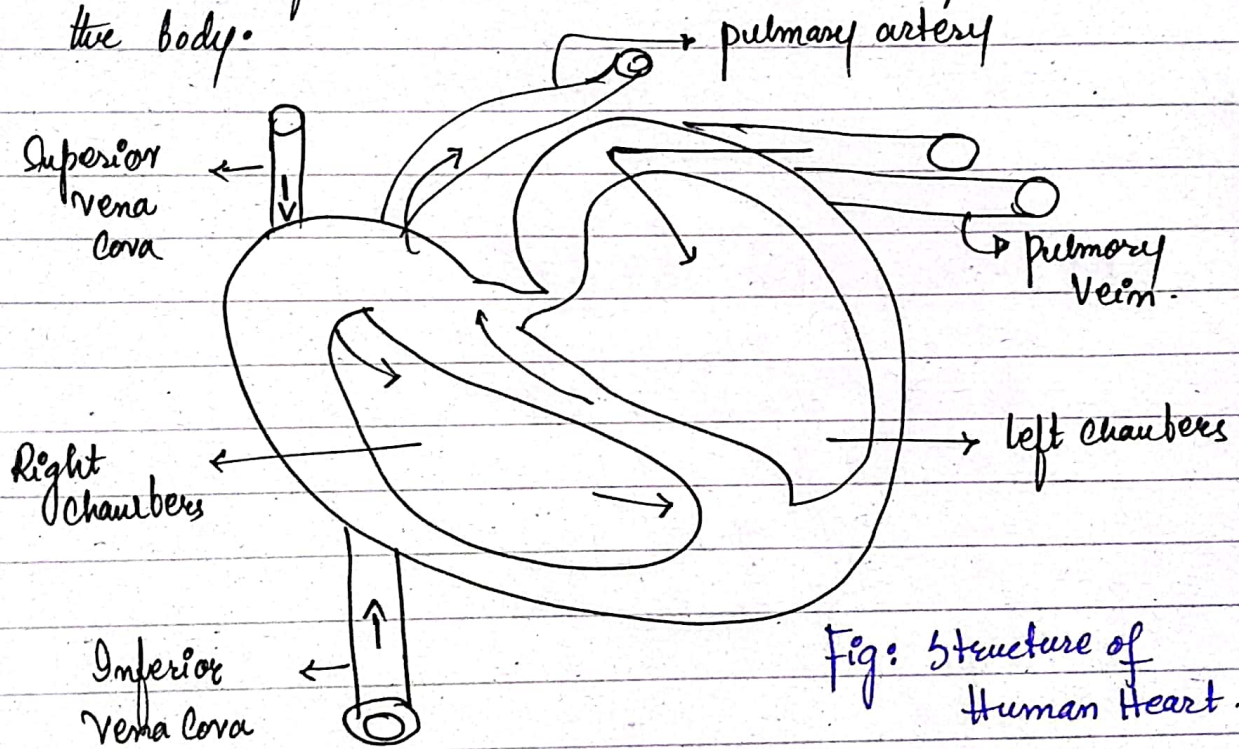
It is used as disposing waste of the surface of the earth and cover it with an insulation blanket to stop the release of harmful gases.



B) Working of human heart in blood circulation.

## HUMAN HEART: ~ OVERVIEW ~

Human heart is a major organ in human body which is responsible for circulation of blood and across the various parts of the body.



## WORKING OF HUMAN HEART:

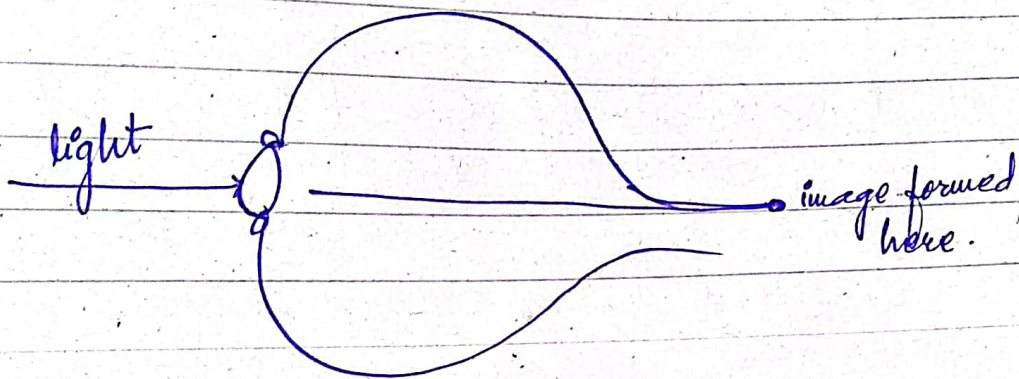
Human heart is responsible for blood circulation across the body parts. It receives deoxygenated blood from vena cava to right chambers. Then pulmonary artery brings it blood to liver, where blood is oxygenated. Also, the oxygenated blood transfer to left chamber using pulmonary vein. Then, in left chamber, there are various veins



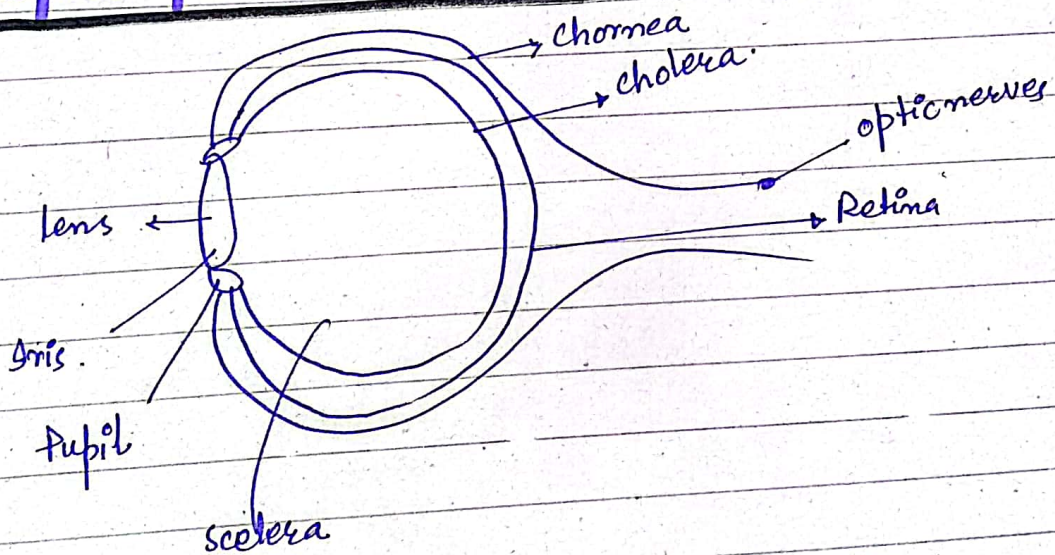




beyond the retina which resulted in unable to distinguish what a person is seeing. The entered light and formed image behind the retina and blurring the vision.



## MAJOR PARTS OF THE HUMAN EYE:



- 01) Iris: The colored part of the eye which controls the light entering the pupil.
- 02) Pupil: Inside the iris which controls the amount of light entered in the eye.



- 03) lens: Transparent structure behind the pupil and controls the light and formed image on the retina.
- 04) Retina: A part of the eye where image formed.
- 05) Optic Nerve: Connects the nerves to the brain to sense the visionary information.
- 06) Cornea: Supports the eye ball and structure.

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